

U.S. Express Mail No.: ET786658697US
Attorney Docket No.: YP-001.C1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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|-----------------------------------|---|-----------------------|
| In Re Patent Application Of: |) | Art Group: 1732 |
| Young Park |) | (Parent Application) |
| Application No.: Not Yet Assigned |) | Examiner: G. Cantelmo |
| Filing Date: November 7, 2001 |) | (Parent Application) |
| Title: HIGH THROUGHPUT THIN FILM |) | Attorney Docket No.: |
| DEPOSITION AND SUBSTRATE |) | YP-001.C1 |
| HANDLING METHOD AND APPARATUS |) | |
| FOR OPTICAL DISK PROCESSING |) | |

November 7, 2001

PRELIMINARY AMENDMENT "A"

BOX: Patent Application
Commissioner for Patents
Washington, DC 20231

Sir:

The present Preliminary Amendment "A" accompanies a Continuation Application of Serial No. 09/542,799 which is being filed under 37 CFR § 1.53(b).


Please amend the originally-filed application which is submitted herewith as follows:

CERTIFICATE OF MAILING UNDER 37 CFR § 1.10

"U.S. EXPRESS MAIL" MAILING LABEL NUMBER : ET786658697US

DATE OF DEPOSIT: November 7, 2001

I hereby certify that this application is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 having the MAILING LABEL NUMBER referenced above, addressed to the Commissioner for Patents, Box Patent Application, Washington, DC 20231 on the DATE OF DEPOSIT referenced above.

 (Signature)

By: Shirley L. Church, Reg. No. 31,858 (Type Name)

Signature Date: November 7, 2001

IN THE SPECIFICATION:

Please insert the following paragraph before the first line of the Specification:

-- This application is a continuation application of Application Serial No. 09/542,799, filed April 4, 2000, currently pending, which claims priority under U.S. Provisional Application No. 60/144,602, filed July 19, 1999. --

Please replace the paragraph beginning at Page 18, line 18 with the following rewritten paragraph:

-- Figure 3 shows how the substrates 326 are being transported over the continuously moving web 322, which is about 50 cm wide to accommodate two substrates 326 positioned transversely across web 322. Figure 3 also shows an arrangement for loading or unloading of the substrates when two substrates are in motion in parallel. The loading and transfer onto moving web 322 or transfer and unloading off of moving web 322 is made via x- and y-movement on the platform 330 which could be a loading or unloading platform depending on placement in the system and direction of motion. For example platform 330 could be a loading platform 142 of the kind shown in Figure 1, or a loading platform 302 of the kind shown in Figure 3, where the x-direction motion is predominantly 327B and the y-direction motion is predominantly 329B. Or, platform 330 could be an unloading platform 144 of the kind shown in Figure 1, or a loading platform 306 of the kind shown in Figure 3, where the x-direction motion is predominantly 327A and the y-direction motion is predominantly 329B. The loading platform 142 may be slightly tilted toward the moving web 122 as shown in Figure 1, and the unloading platform 144 may be slightly tilted away from the moving web 122, as shown in Figure 1. The tilt is adjusted for timely and reliable transfer toward or away from the continuously moving web 122. To begin processing, each substrate 126 is transferred from loading cassette 138 in loading chamber 108 onto loading platform 142 and from there onto moving web 122. After

processing, each substrate 126 is transferred from moving web 122 onto unloading platform 144 and from there to unloading cassette 140 in unloading chamber 110. - -

Please replace the paragraph beginning at Page 20, line 14 with the following rewritten paragraph.

- - Figure 5 A — A is a top view of the lower portion of the system shown in Figure 5, and shows more clearly the relationship between central processing chamber 504, loading chamber 508, unloading chamber 510, loading vacuum valve 518, unloading vacuum valve 520, and vacuum gate valves 512A and 512B which are attached to a vacuum system (not shown) which maintains the desired vacuum in central processing chamber 504. In addition, Figure 5 A — A also clearly shows the relative positions of feed roll stand 524 and second feed roll stand 532, as well as the relative positions of take off roll stand 530 and second take off roll stand 534, with door 513A which provides access to feed roll stands 524 and 532, and door 513B which provides access to take off roll stands 530 and 534.- -

IN THE CLAIMS:

Please cancel Claims 2 - 3, 6, 18, and 24 of the prior application without prejudice, and amend the remaining claims as follows:

Claims not being amended are presented in italics for reference purposes only.

1. (Once Amended) An apparatus for depositing at least one thin film on a substrate useful in electronic applications, the apparatus comprising:

(a) an in-line continuously moving web for simultaneously transporting a number of substrates to which a thin film of material is to be applied, wherein said moving web is a roll-

to-roll moving disposable web consisting essentially of a polymeric material and wherein said substrates are held to said web by friction against or electrostatic attraction to a web surface;

(b) a central processing chamber which is maintained under vacuum and through which at least a portion of said continuously moving web travels;

(c) at least one deposition device which is located within said central processing chamber, where at least a portion of said continuously moving web is exposed to material deposited from said deposition device;

(d) a first moving platform which moves in an x direction and a y direction, which transfers a substrate onto said continuously moving web; and

(e) a second moving platform which moves in an x direction and a y direction, which transfers a substrate from said continuously moving web.

4. (Once Amended) The apparatus of Claim 1, wherein at least one deposition device is a sputtering device.

5. (Once Amended) The apparatus of Claim 1, wherein a device is present which permits web splicing during continuous operation of said apparatus.

7. (Once Amended) The apparatus of Claim 1, wherein said polymeric material is PET.

8. *The apparatus of Claim 4, wherein a power applied to a cathode in said sputtering device is RF power.*

9. *The apparatus of Claim 8, wherein said cathode is a sputtering target.*

10. *The apparatus of Claim 9, wherein a sputtering target used in said sputtering device is rectangular in shape.*
11. *The apparatus of Claim 9, wherein said sputtering target is comprised of a ceramic or metal.*
12. (Once Amended) The apparatus of Claim 11, wherein said sputtering target is comprised of a material having optical transmission properties useful in optical applications.
13. *The apparatus of Claim 4, wherein said sputtering target sputtering device includes a planar magnetron.*
14. (Once Amended) The apparatus of Claim 1, wherein at least one isolating shield is used to separate one thin film deposition area from another thin film deposition area.
15. (Once Amended) The apparatus of Claim 1, wherein at least said first or said second moving platform is located within a plenum chamber which is at a pressure which is different from the pressure in said central processing chamber.
16. (Once Amended) The apparatus of Claim 1, wherein said central processing chamber is maintained at a base vacuum of at least 10^{-5} Torr (1.3×10^{-3} Pa).
17. (Once Amended) The apparatus of Claim 1, wherein said apparatus also includes a cooling surface which permits the cooling of said continuously moving disposable web within said central processing chamber.

19. (Once Amended) A method for depositing at least one thin film on a substrate useful in electronic applications, the method comprising the steps of :
- placing a series of substrates onto an in-line continuously moving disposable web consisting essentially of a polymeric material, wherein said substrates are held to said web by friction against or electrostatic attraction to said web surface;
- exposing a surface of said moving disposable web on which said substrates are sitting to at least one depositing material, to form at least one layer of material on a substrate; and,
- unloading said substrate from said continuously moving disposable web.
20. (Once Amended) The method of Claim 19, wherein said depositing material is deposited using physical vapor deposition.
21. (Once Amended) The method of Claim 20, wherein a pressure at said surface of said substrate is about 10^{-5} Torr (1.3×10^{-3} Pa) or a lower pressure.
22. (Once Amended) The method of Claim 20, wherein said sputtering is carried out using a planar magnetron, and wherein an RF power is applied to a sputtering target, which RF power is about 100 to about 5,000 W at a frequency of about 10 to about 30 MHz.
23. (Once Amended) The method of Claim 19, wherein a plurality of layers is deposited, wherein said moving disposable web is a roll-to-roll web, and wherein the roll speed is based on a film thickness of a depositing material layer which has a narrow processing window relative to other depositing material layers.
25. (Once Amended) The method of Claim 19, wherein said substrate is a plastic substrate.

26. (Once Amended) The apparatus of Claim 1, wherein said disposable web material is polyvinylidene chloride.

IN THE DRAWINGS:

Applicant's attorney discovered that the doors on the side of film deposition system illustrated in Figure 5 A ---- A, which doors provide access to second feed roll stand 532 and second take-off roll stand 534, were misnumbered on the informal drawings which were submitted with the Application. The numbers 512A and 512B which were misnumbered, are the reference numbers for gate valves attached to the vacuum system, as illustrated with reference to Figure 5. So that the doors which provide access to the feed roll stands are properly numbered, the doors illustrated in Figure 5 A ---- A have been numbered 513 A and 513 B, respectively. A copy of Figure 5 as initially filed in the application, marked in red with the changes has been submitted for the Examiner's approval.

Applicant is submitting Formal Drawings with the present Amendment "A".

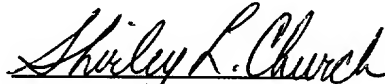
REMARKS

The claims have been amended to clarify particular claim language, correct dependency errors, and to place them in better condition for allowance.

The Specification and Drawings have been amended to correct for misnumbering of particular elements shown in the drawings.

If the Examiner has any questions or would like to make any suggestions regarding the application, he is invited to contact applicant's attorney at the telephone number provided below.

Respectfully Submitted,



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PRELIMINARY AMENDMENT "A"
VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

The following paragraph has been inserted prior to the first sentence in the Specification in the application as originally filed.

This application is a continuation application of Application Serial No. 09/542,799, filed April 4, 2000, currently pending, which claims priority under U.S. Provisional Application No. 60/144,602, filed July 19, 1999.

The paragraph beginning at Page 18, line 18 has been amended as follows.

Figure [3A] 3 shows how the substrates 326 are being transported over the continuously moving web 322, which is about 50 cm wide to accommodate two substrates 326 positioned transversely across web 322. Figure [3A] 3 also shows an arrangement for loading or unloading of the substrates when two substrates are in motion in parallel. The loading and transfer onto moving web 322 or transfer and unloading off of moving web 322 is made via x- and y-movement on the platform 330 which could be a loading or unloading platform depending on placement in the system and direction of motion. For example platform 330 could be a loading platform 142 [as] of the kind shown in Figure 1 [()], or a loading platform 302 [as] of the kind shown in Figure 3 [()], where the x-direction motion is predominantly [327Band] 327B and the y-direction motion is predominantly 329B[, as illustrated in Figure 3]. Or, platform 330 could be an unloading platform 144 [as] of the kind shown in Figure 1 [()], or a loading platform 306 [as] of the kind shown in Figure 3[()] , where the x-direction motion is predominantly 327A and the y-direction motion is predominantly 329B. The loading platform 142 may be slightly tilted toward the moving web 122 as shown in Figure 1, and the unloading platform 144 may be slightly tilted away from the moving web 122, as shown in Figure 1. The tilt is adjusted for timely and reliable transfer toward or away

from the continuously moving web 122. To begin processing, each substrate 126 is transferred from loading cassette 138 in loading chamber 108 onto loading platform 142 and from there onto moving web 122. After processing, each substrate 126 is transferred from moving web 122 onto unloading platform 144 and from there to unloading cassette 140 in unloading chamber 110.

The paragraph beginning at Page 20, line 14 has been amended as follows.

Figure 5 A — A is a top view of the lower portion of the system shown in Figure 5, and shows more clearly the relationship between central processing chamber 504, loading chamber 508, unloading chamber 510, loading vacuum valve 518, unloading vacuum valve 520, and vacuum gate valves 512A and 512B which are attached to a vacuum system (not shown) which maintains the desired vacuum in central processing chamber 504. In addition, Figure 5 A — A also clearly shows the relative positions of feed roll stand 524 and second feed roll stand 532, as well as the relative positions of take off roll stand 530 and second take off roll stand 534, with door 513A which provides access to feed roll stands 524 and 532, and door 513B which provides access to take off roll stands 530 and 534.

IN THE CLAIMS:

1. (Once Amended) An apparatus for depositing at least one thin film on a substrate useful in electronic applications, the apparatus comprising:

(a) [a] an in-line continuously moving web for simultaneously transporting a number of substrates to which a thin film of material is to be applied, wherein said moving web is a roll-to-roll moving disposable web consisting essentially of a polymeric material and wherein said substrates are held to said web by friction against or electrostatic attraction to a web surface;

(b) a central processing chamber which is maintained under vacuum and through which at least a portion of said continuously moving web travels; [and,]

(c) at least one deposition device which is located within said central processing chamber, where at least a portion of said continuously moving web is exposed to material deposited from said deposition device ;

(d) a first moving platform which moves in an x direction and a y direction, which transfers a substrate onto said continuously moving web; and

(e) a second moving platform which moves in an x direction and a y direction, which transfers a substrate from said continuously moving web.

Please cancel Claim 2 without prejudice, as the limitations of Claim 2 have been included in Claim 1.

Please cancel Claim 3, without prejudice, as this claim is more properly brought as an article of manufacture.

4. (Once Amended) The apparatus of Claim 1 [or Claim 2], wherein at least one deposition device is a sputtering device.

5. (Once Amended) The apparatus of Claim 1 [or Claim 2], wherein a device is present which permits web splicing during continuous operation of said apparatus.

Please cancel Claim 6 without prejudice, as the limitations of Claim 6 have been included in Claim 1.

7. (Once Amended) The apparatus of Claim [6] 1 , wherein said polymeric material is PET.

12. (Once Amended) The apparatus of Claim 11, wherein said sputtering target is comprised of a material having optical transmission properties useful in optical [disk] applications.

14. (Once Amended) The apparatus of Claim 1 [or Claim 2], wherein at least one isolating shield is used to separate one thin film deposition area from another thin film deposition area.

15. (Once Amended) The apparatus of Claim [2] 1, wherein said at least said first or said second moving platform is located within a plenum chamber which is at a pressure which is different from the pressure in said central processing chamber.

16. (Once Amended) The apparatus of Claim 1 [or Claim 2], wherein said central processing chamber is maintained at a base vacuum of at least 10^{-5} torr (1.3×10^{-3} Pa).

17. (Once Amended) The apparatus of Claim 1 [or Claim 2], wherein said apparatus also includes a cooling surface which permits the cooling of said continuously moving web within said central processing chamber.

Please cancel Claim 18 without prejudice, as this claim would be better brought as a specialized apparatus claim in a divisional application.

19. (Once Amended) A method for depositing at least one thin film on a substrate useful in electronic applications, the method comprising the steps of :

placing a series of substrates onto [a] an in-line continuously moving disposable web consisting essentially of a polymeric material, wherein said substrates are held to said web by friction against or electrostatic attraction to said web surface;

exposing a surface of said moving disposable web on which said substrates are [setting] sitting to at least one depositing material, to form at least one layer of material on a substrate; and,

unloading said substrate from said continuously moving disposable web.

20. (Once Amended) The method of Claim 19, wherein said depositing material is deposited using physical vapor deposition [or sputtering].

21. (Once Amended) The method of Claim 20, wherein a pressure at said surface of said substrate is [a vacuum of] about 10^{-5} torr (1.3×10^{-3} Pa) or [an increased vacuum] lower pressure.

22. (Once Amended) The method of Claim 20 [or Claim 21], wherein said sputtering is carried out using a planar magnetron, and wherein [the] an RF power is applied to a sputtering target, which RF power is about 100 to about 5,000 W at a frequency of about 10 to about 30 MHZ.

23. (Once Amended) The method of Claim 19, wherein a plurality of layers is deposited, wherein said moving web is a roll-to-roll web, and wherein the roll speed is based on a required film thickness of a depositing material layer which has a narrow processing window relative to other depositing material layers.

Please cancel Claim 24, as the limitations of Claim 24 have been included in Claim

19.

25. (Once Amended) The method of Claim [24] 19, wherein said substrate is [held in place by friction] a plastic substrate.

26. (New) The apparatus of Claim 1, wherein said disposable web material is polyvinyl chloride.

